

POWER MANAGEMENT AND DISTRIBUTION FOR SYSTEM ON A CHIP FOR SPACE APPLICATIONS

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ABSTRACT

In this paper a method for achieving integrated power electronics is discussed. Future spacecraft are projected to feature high levels of integration at the system level (i.e., a “systems-on-a-chip” approach) particularly in areas not typically associated with an integrated approach (such as inertial reference systems, RF communications, imaging, sensors, etc.). Taking full advantage of the miniaturization occurring in these other systems will require commensurate reductions in the size of the power electronics. Power electronics are traditionally larger due to the need for high value passive components requiring significant power handling capabilities. Our approach takes advantage of lower projected power requirements and utilizes integrated, on-chip passives and novel high voltage transistors to achieve adaptive distributed on-chip power management and distribution (PMAD). Operating from a single supply, this on-chip PMAD will operate at power levels of up to 1 W, at frequencies of 1-10 MHz.